

AMENDMENT UNDER 37 C.F.R. § 1.111  
Application 10/762,532  
Atty Docket No.: Q79448

**REMARKS**

The Office Action of September 7, 2004, has been received and it's contents carefully considered.

Claims 1-14 are all the claims pending in the application, prior to this present amendment.

Claims 1, 5, 7, 11, 12, 13 and 14 have been rejected under 35 U.S.C. § 102(b) as anticipated by JP 57-130954 to Izumi.

Applicants submit that JP '954 does not disclose the subject matter of claim 1 as amended above and, accordingly, request withdrawal of this rejection.

The present invention as set forth in claim 1 as amended above is directed to a process for producing a lower aliphatic carboxylic acid ester, comprising reacting a lower alcohol and a lower aliphatic carboxylic acid in a gas phase in the presence of water and a catalyst, wherein said catalyst comprises an inorganic support having supported thereon at least one heteropolyacid and/or heteropolyacid salt.

Thus, applicants have amended claim 1 to incorporate the subject matter of claim 7. Applicants have canceled claim 7, and have amended claim 8 to depend from claim 1 instead of canceled claim 7.

In addition, applicants have added a new claim 15 which states that the inorganic support is other than carbon. Support for the new claim can be seen from Comparative Examples 1 and 2 which employed Catalysts 9 and 10 in which activated carbon was used as the support.

AMENDMENT UNDER 37 C.F.R. § 1.111

Application 10/762,532

Atty Docket No.: Q79448

The Examiner states that JP '954 discloses a process for producing an ethyl ester of acetic acid by reacting 2.5 moles of ethanol and 1 mole of acetic acid in the presence of an aqueous solution of heteropolyacid on active carbon. The Examiner refers to page 405, left hand column, Example 1 of JP '954.

However, JP '954 does not disclose "the presence of an aqueous solution of heteropolyacid on active carbon".

Applicant's enclose herewith an English translation of JP '954. JP '954 discloses an esterification method using a carrier-supported catalyst comprised of a catalyst constituted by a heteropolyacid or its support on active carbon. As can be clearly seen from the enclosed translation, the esterification in Example 1 was not carried out in "the presence of an aqueous solution of heteropolyacid on active carbon". See, the English translation, page 7, line 2 through page 8, line 3, where no mention of an aqueous solution of any kind is made.

In Example 1, JP '954 discloses the use of silica gel as a comparison example. See, the English translation, page 8, lines 4 - 12. As in Example 1 of JP '954, in this comparison example, JP '954 does not disclose the presence of an aqueous solution of heteropolyacid.

Applicants submit that it is clear from the description in the present specification, page 28, line 4 through page 29, line 5, that conducting the esterification process of the present invention in the presence of water is, in fact, unobvious to one of ordinary skill in the art since, in general, the activity of the main reaction decreases in the presence of water, but the present invention has unexpectedly found that with the use of the catalyst of the present invention in the presence of water, the activity of the main reaction can be maintained.

AMENDMENT UNDER 37 C.F.R. § 1.111  
Application 10/762,532  
Atty Docket No.: Q79448

Thus, the invention of the above amended claim 1 is clearly distinguished from JP '954.

In view of the above, applicants submit that JP '954 does not disclose the subject matter of the above claims and, accordingly, request withdrawal of this rejection.

Claims 1 to 14 have been rejected under 35 U.S.C. § 103(a) as obvious over JP '954 in view of U.S. Patent 5,518,699 to Kashnitz et al.

Applicants submit that JP '954 and Kashnitz et al do not disclose or render obvious the subject matter of the claims of the present application and, accordingly, request withdrawal of this rejection.

The Examiner states, with respect to claims 2 and 3, that JP '954 does not teach an inorganic support made of at least silica gel, comprising SiO<sub>2</sub> in an amount of 90% by mass, or alumina.

The Examiner relies on the Kashnitz et al patent for teaching the use of an inorganic catalyst containing SiO<sub>2</sub> and heteropolyacids, and asserts that it would have been obvious to employ this inorganic catalyst in JP '954.

Thus, the Examiner states that Kashnitz et al teach an inorganic catalyst containing SiO<sub>2</sub> that may be employed for ester synthesis, but does not teach a gel type of silica. The Examiner argues that there is little difference between regular silica and a gel type of silica with respect to their corresponding use in the process, in the absence of unexpected results.

In addition, the Examiner asserts that the amount of SiO<sub>2</sub> present in silica gel does not impart patentability to a process, where such value is that which would be determined by one of ordinary skill in the art in order to achieve the optimum operation of the process. The Examiner

AMENDMENT UNDER 37 C.F.R. § 1.111

Application 10/762,532

Atty Docket No.: Q79448

states that concentration is well understood to be a result effective variable especially when attempting to control selectivity in a process.

In response, as discussed above, JP '954 does not teach or suggest conducting the reaction of the present invention in the presence of water and the catalyst set forth in the claims of the present application.

Further, as mentioned above, JP '954 discloses the use of silica gel in a comparative example. Accordingly, it is not clear to applicants why the Examiner relies on Kashnitz for a disclosure of silica.

In any event, Kashnitz et al disclose that in particularly preferred embodiments of an esterification catalyst in a reaction distillation, catalysts containing  $\text{TiO}_2$  and  $\text{ZrO}_2$  have as further constituents, clays,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , ... and heteropolyacids. That is to say, Kashnitz et al teach catalysts based on  $\text{TiO}_2$  or  $\text{ZrO}_2$ , which may secondarily contain  $\text{SiO}_2$ , a heteropolyacid, etc., and do not teach or suggest the use of a catalyst comprised of a heteropolyacid supported on silica or silica gel. Further, as discussed above, JP '954 discloses that the catalyst should be constituted by a heteropolyacid or its salt supported on active carbon, and discloses in a comparative example that a catalyst comprised of a heteropolyacid supported on silica gel did not produce results as good as those obtained when using activated carbon. Accordingly, applicants submit that one of ordinary skill in the art would not have any motivation to employ any silica containing catalyst disclosed in Kashnitz et al in the process of JP '954.

In addition, although Example 3 of Kashnitz et al discloses an esterification reaction of acetic acid and butanol, the catalyst used therein is  $\text{TiO}_2$ . Thus, Kashnitz et al neither teach nor

AMENDMENT UNDER 37 C.F.R. § 1.111  
Application 10/762,532  
Atty Docket No.: Q79448

suggest in Example 3 the use of a catalyst of heteropolyacid on an inorganic support in the reaction of the present invention. Of course, Kashnitz et al neither teach nor suggest the presence of water in the esterification process of the present invention.

In view of the above, applicants submit that JP '954 and Kashnitz et al do not disclose or suggest the presently claimed invention and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

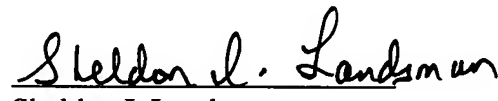
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**23373**

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